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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
SCHINDLER, DAVID M	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/627,420	STOLFUS ET AL.	
	Examiner	Art Unit	
	David Schindler	2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 February 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the communication filed on 2/24/2006.

Response to Arguments

2. Applicant's arguments filed 2/24/2006 have been fully considered but they are not persuasive.

With regard to Applicant's arguments in the last paragraph of page 3 and the first four paragraphs of page 4 of the Remarks, the Examiner respectfully disagrees.

3. The Examiner notes the last paragraph of page 7 of Behrens, as well as lines 1-5 of page 8 of Behrens, as well as Figures 1 and 3. Specifically, it is noted that Behrens states that the compressor blade moving in a direction of rotation 8 has a velocity component v at a right angle to the magnetic field B. Behrens further states that due to the Lorentz force F=qv X B, an induction current I is induced in the top side of 13, and that this induction current I, for its part, produced a secondary magnetic field, that counteracts the magnetic field B of the rod magnet 9 and induces an induction current U_{ind} in the induction coil 10. With regard to this, the Examiner notes that the coil must be within range of the secondary magnetic field that counteracts the magnetic field B of the magnet in order for the secondary magnetic field to induce an induction current U_{ind} in the coil. Therefore, in the combination of Behrens in view of Nath, in which the coil is replaced with a giant magnetoresistor (gmr), the gmr must also be within range of the secondary magnetic field that counteracts the magnetic field B of the magnet in order for the secondary magnetic field to induce a signal in the gmr. Therefore, given this and the orientation disclosed in Figures 1 and 3, it appears that the gmr must also be within

range of the magnetic field generated by the magnet, or else it will not be within range of the secondary magnetic field, and especially not a secondary magnetic field that counteracts the magnetic field B (see Figures 1 and 3). Therefore, the Examiner respectfully disagrees with Applicant. Applicant additionally argues that there is no motivation to combine Behrens with Nath, however the Examiner respectfully disagrees. The Examiner notes, as is stated in the rejection below, that it would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a magnetoresistor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13 of Nath). Nath discloses that a coil or a giant magnetoresistive sensor may be used to detect eddy currents (Column 4, Lines 3-18 of Nath), and therefore it would have been obvious to use either of the above to detect the secondary magnetic fields generated by eddy currents. Therefore, the Examiner respectfully disagrees with Applicant.

With regard to the last three lines of the last paragraph of page 5 of the Remarks, the Examiner respectfully disagrees and notes that the claims do not recite magnetoresistors that are properly biased by a permanent magnet. See lines 7-11 of Claim 1.

With regard to the first three paragraphs of page 6 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action.

With regard to lines 5-23 of page 8 and lines 1-2 of page 9 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above

paragraph 3 of this Office Action. Additionally, the Examiner respectfully disagrees and notes that the claims do not recite magnetoresistors that are properly biased by a permanent magnet. See lines 7-11 of Claim 1.

With regard to the second and third paragraph of page 10 and the first two paragraphs of page 11 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action.

With regard to the fourth, fifth, and sixth paragraphs of page 11 and lines 1-4 of page 12 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action.

With regard to the second, third, and fourth full paragraphs of page 12 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action.

With regard to the second and third paragraphs of page 13 and all of page 14 and lines 1-2 of page 15 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action. Additionally, the Examiner notes that claim 14 does not recite positioning a magnetoresistor so as to be biased by the permanent magnet as argued by Applicant in the first full paragraph of page 14 of the Remarks.

With regard to the second and third full paragraphs of page 15 and lines 1-15 of page 16 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action. Furthermore, the Examiner notes that Adelerhof was not used to teach in the features argued by Applicant in the

last three lines of the third full paragraph of page 15 and lines 1-2 of page 16 of the Remarks.

With regard to the last full paragraph of page 16 and lines 1-11 of page 17, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 3 of this Office Action.

4. With regard to the first, second, third, and fourth full paragraphs of page 18 and lines 1-12 of page 19 of the Remarks, the Examiner respectfully disagrees. The Examiner first notes Figure 4 of Stolfus, and correspondingly the last two paragraphs of column 2 of Stolfus. The sensor of Figure 4 provides a digital pulse type output for every gear tooth that passes in front of the sensor (see lines 65-67 of column 2 of Stolfus). Furthermore, Stolfus states "... thereby providing a substantially improved duty cycle output from the vehicle speed sensor circuit, which is independent of an associated sensor duty cycle." (Abstract, Lines 5-10 of Stolfus). From this, the Examiner has interpreted that the output of the vehicle speed sensor circuit is independent of the sensor duty cycle created by the digital pulse type outputs of the sensor. The sensor duty cycle appears to be created by the digital pulse type outputs that appear to be generated as each gear tooth passes in front of the sensor. Thus, stating that the duty cycle output from the vehicle speed sensor circuit is independent of an associated sensor duty cycle appears to mean that the duty cycle output from the vehicle speed sensor circuit is independent from the number of teeth of the gear as it is the gear teeth in combination with the sensor that create the sensor duty cycle. Given the above, the Examiner respectfully disagrees with Applicant.

With regard to the fourth and fifth full paragraphs of page 19 and lines 1-9 of page 20 of the Remarks, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 4 of this Office Action.

With regard to the second and third full paragraphs of page 21 and paragraphs one and two on page 22, the Examiner respectfully disagrees and directs Applicant's attention to the above paragraph 4 of this Office Action.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1 and 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297).

As to Claim 1,

Behrens discloses a non-ferromagnetic compressor wheel of a

turbocharger ((Page 6 Lines 12-13) and (Page 6, Lines 24-25) and (Page 7, Lines 10-11 / note: aluminum)), the non-ferromagnetic compressor wheel having fins ((6) / blades) (Figure 1), a permanent magnet (9) positioned so as to induce eddy currents on the fins ((Page 4, Lines 31-34) and (Page 7, Lines 31-35) and (Page 8, Lines 1-5)), and, at least one coil (10) positioned with respect to the non-ferromagnetic compressor wheel and the permanent magnet so as to be magnetically biased by the permanent magnet and so as to sense rotation of the non-ferromagnetic compressor wheel ((Page 4, Lines 31-34) and (Page 7, Lines 31-35) and (Page 8, Lines 1-5) and (Page 8, Lines 16-28) and (Figure 3)).

Behrens does not disclose replacing the coil with a magnetoresistor.

Nath discloses that a coil or a giant magnetoresistive sensor may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a magnetoresistor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 2,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

8. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and in further view of Cila et al. (3,846,697).

As to Claim 3,

Behrens discloses a housing wall (2) near the non-ferromagnetic compressor wheel (Figure 1).

Behrens in view of Nath does not disclose the permanent magnet and the magnetoresistor are housed within a housing having external threads, and wherein the housing is threaded into a wall near the non-ferromagnetic compressor wheel.

Cila et al. discloses the permanent magnet (22) and the magnetoresistor (26) are housed within a housing (12) having external threads ((Figures 1-4) and (Column 2, Lines 35-48)), and wherein the housing is threaded into a connector (Column 2, Lines 22-26).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the permanent magnet and the magnetoresistor are housed within a housing having external threads, and wherein the housing is threaded into a wall near the non-ferromagnetic compressor wheel given the above disclosure and teaching of Cila et al. in order to firmly attach the housing having external threads to the wall near the non-ferromagnetic compressor wheel.

As to Claim 4,

Behrens in view of Nath does not disclose the housing has a faceted portion arranged to receive a tool for turning the housing into the wall.

Cila et al. discloses the housing (12) has a faceted portion (hexagonally-shaped) ((Figure 1) and (Column 2, Lines 20-26)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the housing has a faceted portion arranged to receive a tool for turning the housing into the wall given the above disclosure and the teaching of Cila et al. in order to firmly secure the housing to the wall.

It is noted that Cila et al. does not explicitly disclose a tool for turning the housing into the wall, however, it would have been obvious to a person of ordinary skill in the art to use a tool, given the faceted portion of the housing disclosed in Cila et al., in order to ensure the housing was tightly and securely connected to the wall.

9. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and in further view of Takizawa et al. (6,894,484).

As to Claim 5,

Behrens discloses a housing wall (2) near the non-ferromagnetic compressor wheel (Figure 1).

Behrens in view of Nath does not disclose the permanent magnet and the magnetoresistor are housed within a housing having a screw receiving flange for fastening to a wall near the non-ferromagnetic compressor wheel.

Takizawa et al. discloses the permanent magnet ((28) and (Column 6, Line 47)) and the magnetoresistor ((27) and (Column 6, Lines 44-45)) are housed within a housing ((24) of sensor (20)) that is attached to housing (4) by screwing a flange formed in the base end portion of the sensor (20) to a mounting seat (Column 6, Lines 24-35).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the permanent magnet and the magnetoresistor are housed within a housing having a screw receiving flange for fastening to a wall near the non-ferromagnetic compressor wheel given the above disclosure and the teaching of Takizawa et al. in order to firmly secure the housing having a screw receiving flange to the wall.

As to Claim 6,

Behrens in view of Nath does not disclose the permanent magnet abuts the magnetoresistor.

Takizawa et al. discloses the permanent magnet (28) abuts the magnetoresistor ((27) and (Column 6, Lines 44-45)) (Figure 2).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the permanent magnet abuts the magnetoresistor as taught by Takizawa et al. in order to ensure that the magnetoresistor is properly biased by the permanent magnet.

As to Claim 7,

Behrens does not disclose the magnetoresistor is coupled to a comparator.

Nath discloses the magnetoresistor is coupled to a comparator ((Column 4, Lines 3-18) and (Column 4, Lines 28-55)).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include the magnetoresistor is coupled to a comparator as taught by Nath in order to determine the presence of a crack in the airfoil (Column 4, Lines 28-57).

10. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and in further view of Stolfus (6,771,063).

As to Claim 8,

Behrens in view of Nath discloses as explained above.

Behrens discloses a coil produces pulses as the fins travel past the coil ((Figure 5) and (Page 8, Lines 9-20)).

Behrens does not disclose replacing the coil with a magnetoresistor.

Nath discloses that a coil or a giant magnetoresistive sensor may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a magnetoresistor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

Behrens in view of Nath does not disclose the magnetoresistor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the magnetoresistor.

Stolfus discloses a sensor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the sensor ((Figure 5) and (Column 5, Lines 60-65)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the magnetoresistor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the magnetoresistor given the above disclosure and teaching of Stolfus in order to improve the output of the sensor system (Abstract, Lines 1-10).

Given the above combination, by replacing the coil with the magnetoresistor, the magnetoresistor would produce pulses as the fins travel past the magnetoresistor and would be coupled to the to the pulse divider as the sensor in Behrens is the coil. Also note that each time a tooth passes the vehicle speed sensor mentioned in Stolfus (Abstract, Last 3 lines), a pulse will be generated.

As to Claim 9,

Behrens discloses the permanent magnet has a North-South axis, and where the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

11. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath

et al. (herein referred to as "Nath") (6,707,297) and Stolfus (6,771,063) and in further view of Cila et al. (3,846,697).

As to Claim 10,

Behrens discloses a housing wall (2) near the non-ferromagnetic compressor wheel (Figure 1).

Behrens in view of Nath and Stolfus does not disclose the permanent magnet and the magnetoresistor are housed within a housing having external threads, and wherein the housing is threaded into a wall near the non-ferromagnetic compressor wheel.

Cila et al. discloses the permanent magnet (22) and the magnetoresistor (26) are housed within a housing (12) having external threads ((Figures 1-4) and (Column 2, Lines 35-48)), and wherein the housing is threaded into a connector (Column 2, Lines 22-26).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Stolfus to include the permanent magnet and the magnetoresistor are housed within a housing having external threads, and wherein the housing is threaded into a wall near the non-ferromagnetic compressor wheel given the above disclosure and teaching of Cila et al. in order to firmly attach the housing having external threads to the wall near the non-ferromagnetic compressor wheel.

As to Claim 11,

Behrens in view of Nath and Stolfus does not disclose the housing has a faceted portion arranged to receive a tool for turning the housing into the wall.

Cila et al. discloses the housing (12) has a faceted portion (hexagonally-shaped) ((Figure 1) and (Column 2, Lines 20-26)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Stolfus to include the housing has a faceted portion arranged to receive a tool for turning the housing into the wall given the above disclosure and the teaching of Cila et al. in order to firmly secure the housing to the wall.

It is noted that Cila et al. does not explicitly disclose a tool for turning the housing into the wall, however, it would have been obvious to a person of ordinary skill in the art to use a tool, given the faceted portion of the housing disclosed in Cila et al., in order to ensure the housing was tightly and securely connected to the wall.

12. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and Stolfus (6,771,063) and in further view of Takizawa et al. (6,894,484).

As to Claim 12,

Behrens discloses a housing wall (2) near the non-ferromagnetic compressor wheel (Figure 1).

Behrens in view of Nath and Stolfus does not disclose the permanent magnet and the magnetoresistor are housed within a housing having a screw receiving flange for fastening to a wall near the non-ferromagnetic compressor wheel.

Takizawa et al. discloses the permanent magnet ((28) and (Column 6, Line 47)) and the magnetoresistor ((27) and (Column 6, Lines 44-45)) are housed within a housing ((24) of sensor (20)) that is attached to housing (4) by screwing a flange formed in the base end portion of the sensor (20) to a mounting seat (Column 6, Lines 24-35).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Stolfus to include the permanent magnet and the magnetoresistor are housed within a housing having a screw receiving flange for fastening to a wall near the non-ferromagnetic compressor wheel given the above disclosure and the teaching of Takizawa et al. in order to firmly secure the housing having a screw receiving flange to the wall.

As to Claim 13,

Behrens in view of Nath and Stolfus does not disclose the permanent magnet abuts the magnetoresistor.

Takizawa et al. discloses the permanent magnet (28) abuts the magnetoresistor ((27) and (Column 6, Lines 44-45)) (Figure 2).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Stolfus to include the permanent magnet abuts the magnetoresistor as taught by Takizawa et al. in order to ensure that the magnetoresistor is properly biased by the permanent magnet.

13. Claims 14-18, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in

view of Nath et al. (herein referred to as "Nath") (6,707,297) and in further view of Takizawa et al. (6,894,484).

As to Claim 14,

Behrens discloses a non-ferromagnetic compressor wheel of a turbocharger ((Page 6 Lines 12-13) and (Page 6, Lines 24-25) and (Page 7, Lines 10-11 / note: aluminum)), the non-ferromagnetic compressor wheel having fins ((6) / blades) (Figure 1), a permanent magnet (9) positioned so as to induce eddy currents on the fins ((Page 4, Lines 31-34) and (Page 7, Lines 31-35) and (Page 8, Lines 1-5)), and, a coil (10) (Page 6, Lines 13-17)) positioned with respect to the non-ferromagnetic compressor wheel and the permanent magnet so as to be magnetically biased by the permanent magnet and so as to sense a magnetic field induced by the eddy currents to thereby detect rotation of the non-ferromagnetic compressor wheel ((Page 4, Lines 31-34) and (Page 7, Lines 31-35) and (Page 8, Lines 1-5) and (Page 8, Lines 16-28) and (Figure 3)).

Behrens does not disclose replacing the coil with an active magnetic sensor, and a magnetic field sensor housing attached to a structure in proximity to the non-ferromagnetic compressor wheel, a permanent magnet disposed within the magnetic field sensor housing, and an active magnetic field sensor disposed within the magnetic field sensor housing.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

Takizawa et al. discloses a magnetic field sensor housing (24) attached to a structure (4), a permanent magnet ((28) and (Column 6, Line 47)) disposed within the magnetic field sensor housing (Figure 2), and an active magnetic field sensor ((27) and (Column 6, Lines 44-45)) disposed within the magnetic field sensor housing (Figure 2).

It would have been obvious a the time of the invention to modify Behrens in view of Nath to include a magnetic field sensor housing attached to a structure in proximity to the non-ferromagnetic compressor wheel, a permanent magnet disposed within the magnetic field sensor housing, and an active magnetic field sensor disposed within the magnetic field sensor housing given the above disclosure and the teaching of Takizawa et al. in order to detect rotation (Column 6, Lines 41-42) and to prevent elements such as dirt from affecting the magnetic field sensor.

As to Claim 15,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

As to Claim 16,

Behrens discloses the permanent magnet abuts the coil (Figure 1).

Behrens does not disclose replacing the coil with an active magnetic sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

It is noted that given the above combination, the active magnetic sensor would abut the permanent magnet.

As to Claim 17,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

As to Claim 18,

Behrens does not disclose the active magnetic field sensor is coupled to a comparator.

Nath discloses the active magnetic field sensor is coupled to a comparator ((Column 4, Lines 3-18) and (Column 4, Lines 28-55)).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include the active magnetic field sensor is coupled to a comparator as taught by Nath in order to determine the presence of a crack in the airfoil (Column 4, Lines 28-57).

As to Claim 23,

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5).

Behrens does not disclose replacing the coil with at least one giant magnetoresistive element.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a giant magnetoresistive element given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 25,

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5).

Behrens does not disclose replacing the coil with at least one Hall effect sensing element.

Nath discloses that a coil or a Hall element (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a Hall effect sensing element given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

14. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein

referred to as "Nath") (6,707,297) and Takizawa et al. (6,894,484) and in further view of Adelerhof (6,559,638).

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5).

Behrens in view of Nath and Takizawa et al. do not disclose the active magnetic field sensor includes at least one anisotropic magnetoresistive element.

Adelerhof discloses the active magnetic field sensor includes at least one anisotropic magnetoresistive element (Column 1, Lines 40-44 / note: AMR).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Takizawa to include replacing the coil with an anisotropic magnetoresistive element given the above disclosure and teaching of Adelerhof in order to detect a magnetic field.

15. Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and Takizawa et al. (6,894,484) and in further view of Stolfus (6,771,063).

As to Claim 19,

Behrens in view of Nath and Takizawa et al. discloses as explained above.

Behrens discloses a coil produces pulses as the fins travel past the coil ((Figure 5) and (Page 8, Lines 9-20)).

Behrens does not disclose replacing the coil with an active magnetic field sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic field senor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic field sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

Behrens in view of Nath and Takizawa et al. does not disclose the magnetoresistor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the magnetoresistor.

Stolfus discloses a sensor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the sensor ((Figure 5) and (Column 5, Lines 60-65)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Takizawa et al. to include the magnetoresistor is coupled to a pulse divider, and wherein the pulse divider divides the pulses produced by the magnetoresistor given the above disclosure and teaching of Stolfus in order to improve the output of the sensor system (Abstract, Lines 1-10).

Given the above combination, by replacing the coil with the magnetoresistor, the magnetoresistor would produce pulses as the fins travel past the magnetoresistor and would be coupled to the to the pulse divider as the sensor in Behrens is the coil. Also note that each time a tooth passes the vehicle speed sensor mentioned in Stolfus (Abstract, Last 3 lines), a pulse will be generated.

As to Claim 20,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

As to Claim 21,

Behrens discloses the permanent magnet abuts the coil (Figure 1).

Behrens does not disclose replacing the coil with an active magnetic sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

It is noted that given the above combination, the active magnetic sensor would abut the permanent magnet.

As to Claim 22,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

16. Claims 26-33, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and Stolfus (6,771,063).

As to Claim 26,

Behrens discloses inducing eddy currents in fins ((6) / blades) of the non-ferromagnetic compressor wheel ((Page 6, Lines 24-25) and (Page 7, Lines 10-11 / note: aluminum) and (Page 7, Lines 31-35) and (Page 8, Lines 1-5)), sensing a magnetic field induced by the eddy currents by use of coil ((10) and (Page 6, Lines 13-17) and (Page 8, Lines 1-5)), so as to produce pulses having a pulse rate dependent upon a speed at which the non-ferromagnetic compressor wheel rotates ((Page 8, Lines 16-28) and (Figure 3)).

Behrens does not disclose replacing the coil with an active magnetic sensor, and reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

Stolfus discloses reducing the pulse rate and having a substantially improved duty cycle which is independent of an associated sensor duty cycle ((Column 5, Lines 49-65) and (Abstract, Lines 1-10)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include reducing the pulse rate so as to provide a consistent pulse rate regardless of the number of the fins of the non-ferromagnetic compressor wheel given

the above disclosure and teaching of Stolfus in order to improve the output of the sensor system (Abstract, Lines 1-10) and to increase circuit versatility by enabling the circuit to function with any number of compressor wheels with different numbers of fins.

As to Claim 27,

Behrens in view of Nath do not disclose the reducing of the pulse rate includes reducing the pulse rate by use of a divider.

Stolfus discloses the reducing of the pulse rate includes reducing the pulse rate by use of a divider ((Figure 5) and (Column 5, Lines 53-65)).

It would have been obvious at the time of the invention to modify Behrens in view of Nath to include the reducing of the pulse rate includes reducing the pulse rate by use of a divider as taught by Stolfus in order to improve the output of the sensor system (Abstract, Lines 1-10).

As to Claim 28,

Behrens discloses the inducing of eddy currents in fins of the non-ferromagnetic compressor wheel includes inducing eddy currents by use of a permanent magnet, wherein the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel ((Figure 1) and Page 7, Lines 31-35) and (Page 8, Lines 1-5)).

As to Claim 29,

Behrens discloses the inducing of eddy currents in fins of the non-ferromagnetic compressor wheel includes inducing the eddy currents by use of a permanent magnet

((Figure 1) and Page 7, Lines 31-35) and (Page 8, Lines 1-5)), and the permanent magnetic abuts the coil.

Behrens does not disclose replacing the coil with an active magnetic sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 30,

Behrens discloses the permanent magnet has a North-South axis, and wherein the North-South axis is pointed at the non-ferromagnetic compressor wheel (Figure 1).

As to Claim 31,

Behrens discloses magnetically biasing the coil ((Figure 1) and Page 7, Lines 31-35) and (Page 8, Lines 1-5)).

Behrens does not disclose replacing the coil with an active magnetic sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above

disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 32,

Behrens discloses the inducing of eddy currents in fins of the non-ferromagnetic compressor wheel includes inducing the eddy currents by use of a permanent magnet ((Figure 1) and Page 7, Lines 31-35) and (Page 8, Lines 1-5)), wherein the magnetically biasing of the coil includes magnetically biasing the magnetic field by use of a permanent magnet, and wherein the coil is biased and the eddy currents are induced by the same permanent magnet ((Figures 1 and 3) and Page 7, Lines 31-35) and (Page 8, Lines 1-5)).

Behrens does not disclose replacing the coil with an active magnetic sensor.

Nath discloses that a coil or a giant magnetoresistive sensor (active magnetic sensor) may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with an active magnetic sensor given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 33,

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5)..

Behrens does not disclose replacing the coil with a giant magnetoresistive element.

Nath discloses that a coil or a giant magnetoresistive sensor may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a giant magnetoresisive element given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

As to Claim 35,

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5).

Behrens does not disclose replacing the coil with a Hall effect sensing element.

Nath discloses that a coil or a Hall element may be used to detect eddy currents (Column 4, Lines 3-18).

It would have been obvious to a person of ordinary skill in the art to modify Behrens to include replacing the coil with a Hall element given the above disclosure and teaching of Nath in order to detect the secondary magnetic fields generated by eddy currents (Column 4, Lines 11-13).

17. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and Stolfus (6,771,063) and in further view of Adelerhof (6,559,638).

Behrens discloses a coil as a magnetic field sensor (Page 8, Lines 1-5).

Behrens in view of Nath and Stolfus do not disclose the active magnetic field sensor includes at least one anisotropic magnetoresistive element.

Adelerhof discloses the active magnetic field sensor includes at least one anisotropic magnetoresistive element (Column 1, Lines 40-44 / note: AMR).

It would have been obvious at the time of the invention to modify Behrens in view of Nath and Stolfus to include replacing the coil with an anisotropic magnetoresistive element given the above disclosure and teaching of Aderehof in order to detect a magnetic field.

18. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Behrens et al. (herein referred to as "Behrens") (DE 19623236 A1) in view of Nath et al. (herein referred to as "Nath") (6,707,297) and Stolfus (6,771,063) and in further view of Hartman et al. (2004/0118117).

Behrens in view of Nath and Stolfus do not disclose storing an actual maximum compressor sensed by the active magnetic field sensor.

Hartman et al. discloses compressor data for the maximum desired turbocharger speed stored in an engine control unit (ECU).

It would have been obvious to a person of ordinary skill in the art to modify Behrens in view of Nath and Stolfus to include storing an actual maximum compressor sensed by the active magnetic field sensor given the above disclosure and teaching of Hartman et al. in order to prevent the maximum desired turbocharger shaft speeds from being exceeded (Page 2, Paragraph [0022], Last 4 lines).

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Schindler whose telephone number is (571) 272-2112. The examiner can normally be reached on M-F (8:00 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (571) 272-2180. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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